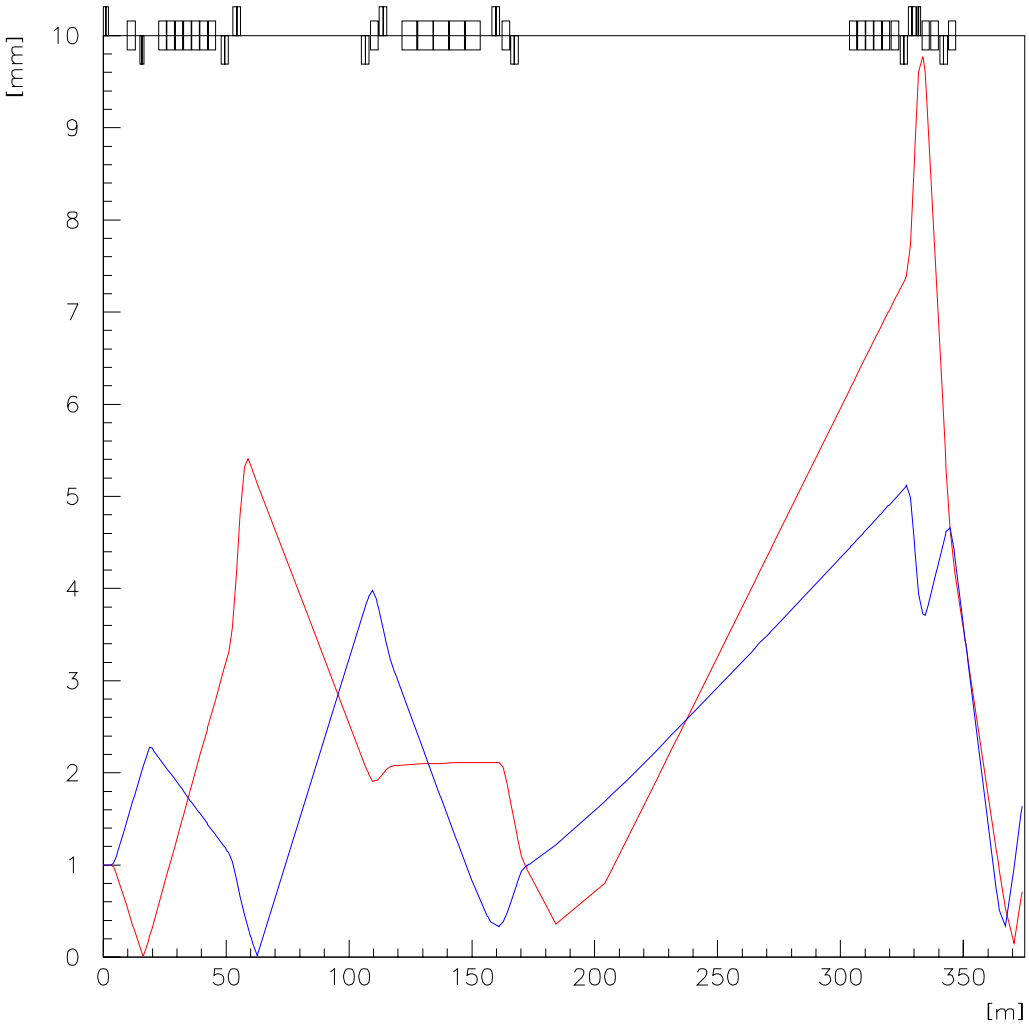
Model	Uses FODO	Has quadrupoles in carrier pipe
Tweaked Baseline	No	No
FODO	Yes	Yes

Table 1: Summary of the key features of the beamline models compared in this note.

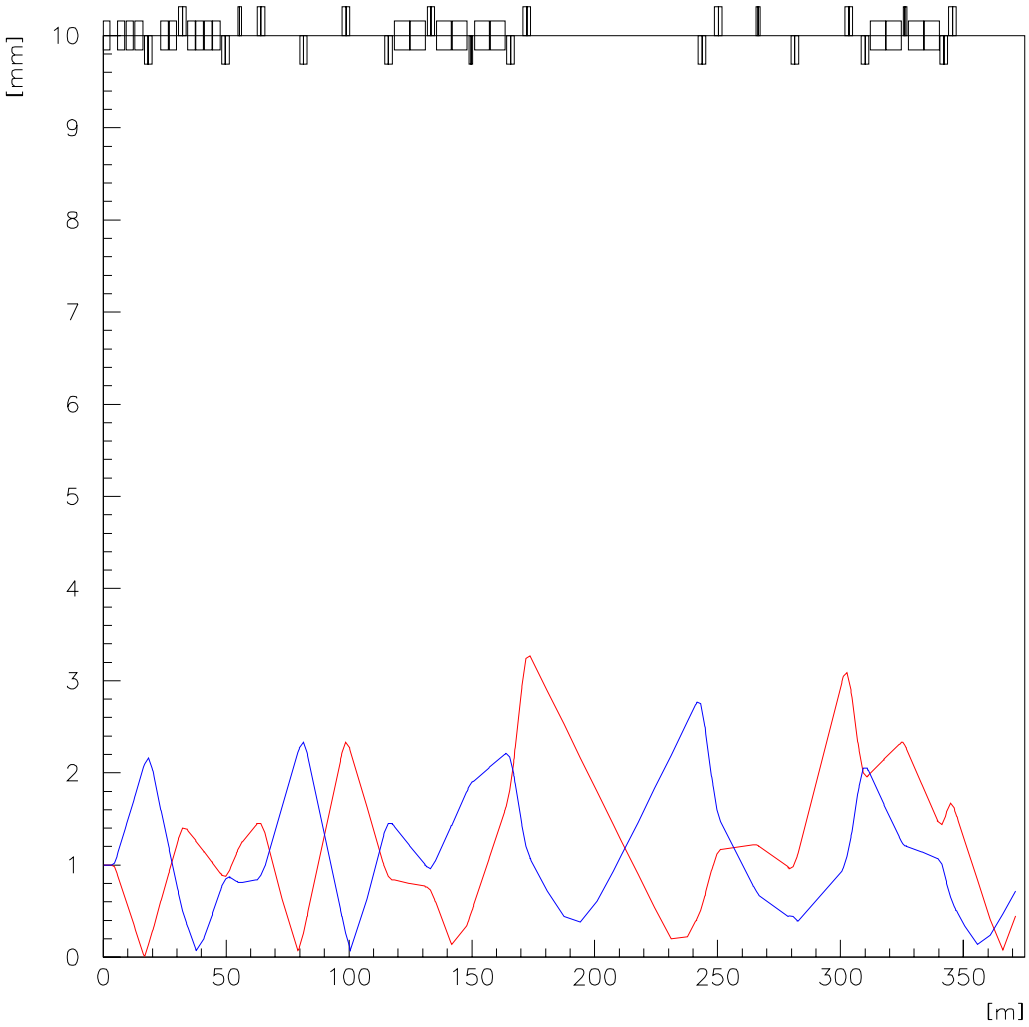
"Tweaked Baseline"



1 mm by 1 μradian and $\Delta p/p = 10^{-4}$.
Horizontal envelope is blue.

TRK
02Apr02
NuMI Review

"FODO"



1 mm by 1 μradian and $\Delta p/p = 10^{-4}$.
Horizontal envelope is blue.

TRK
02Apr02
NuMI Review

Model	Horizontal $[\pi \cdot mm \cdot mr]$	Vertical $[\pi \cdot mm \cdot mr]$
Tweaked Baseline	110	444
FODO	1116	1321

Table 2: Normalized admittance, in $\pi \cdot mm \cdot mr$, of each model. Admittance of each plane is calculated independently.

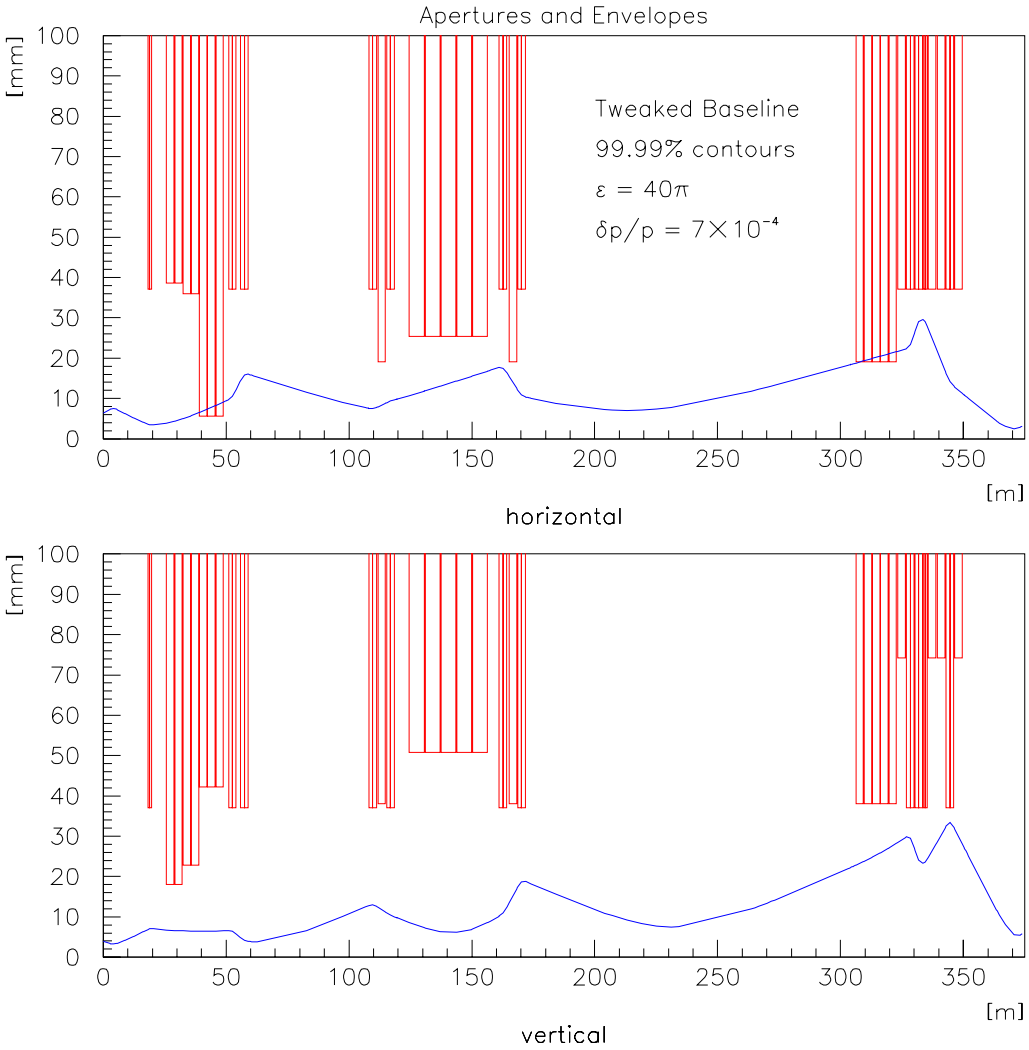
Model	Horizontal $[\pi \cdot mm \cdot mr]$	Vertical $[\pi \cdot mm \cdot mr]$	Aperture $[mm^2]$
Tweaked Baseline	35	200	7000
FODO	648	707	458136
FODO	500	500	250000

Table 3: Normalized admittance, including $\delta p/p = \pm 1.1 \times 10^{-3}$, for each model. Horizontal and vertical phase space are populated simultaneously, though uncorrelated. "FODO" is shown a second time with the admittance truncated to the emittance of the Main Injector.

Model	$\pm\delta p/p$
Tweaked Baseline	2.3×10^{-3}
FODO	3.8×10^{-3}

Table 4: Maximum momentum acceptance at 40π.

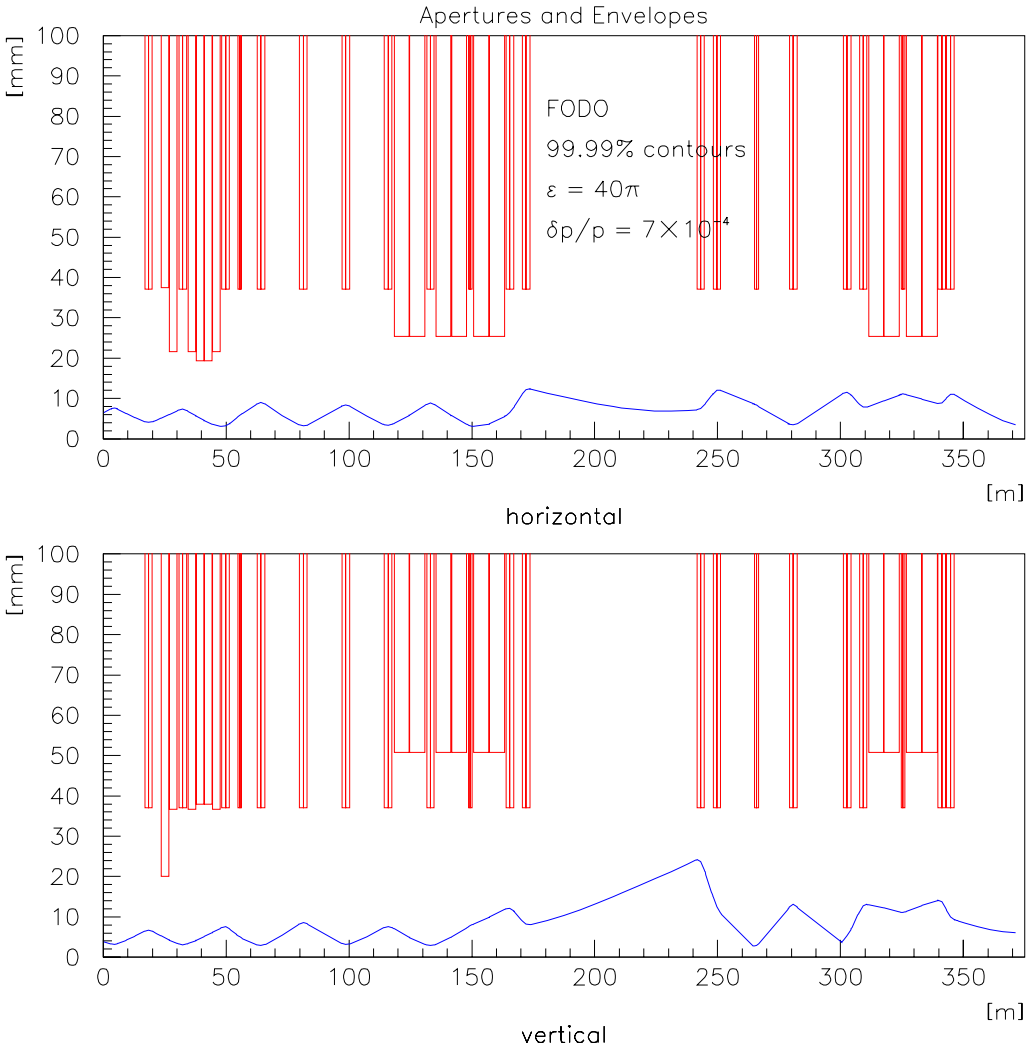
"Tweaked Baseline"



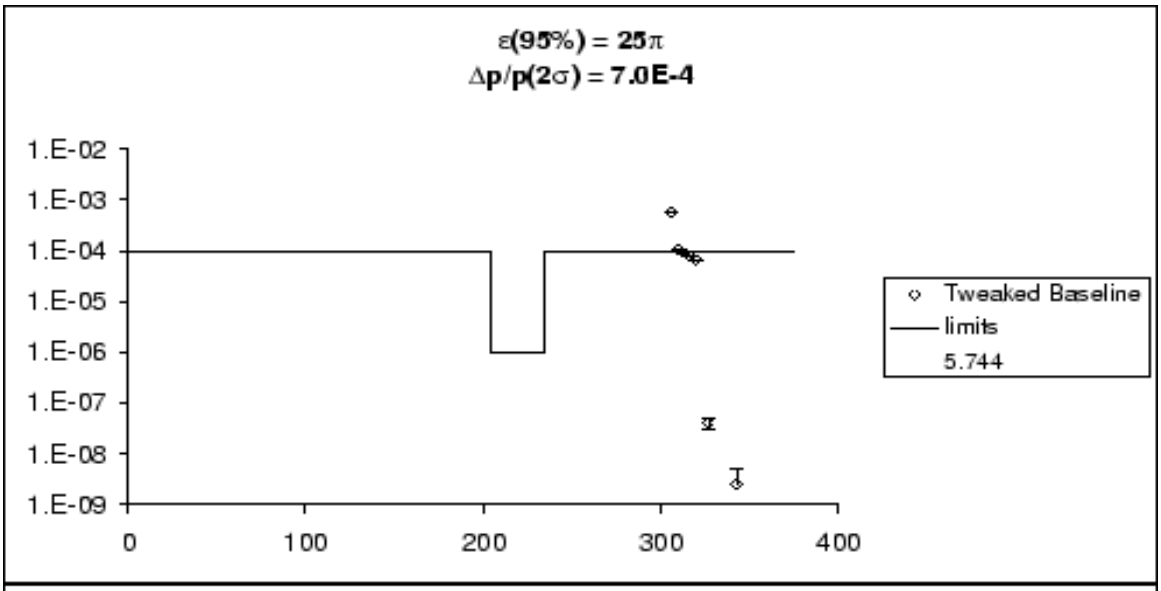
40π, $\Delta p/p(2\sigma) = 14.0 \times 10^{-4}$

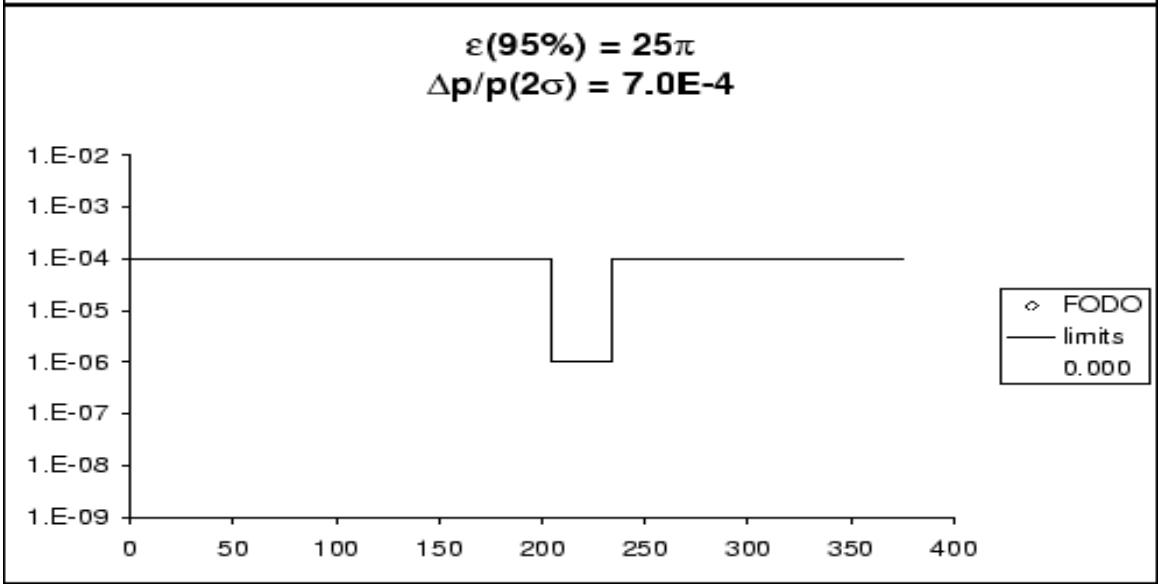
TRK
02Apr02
NuMI Review

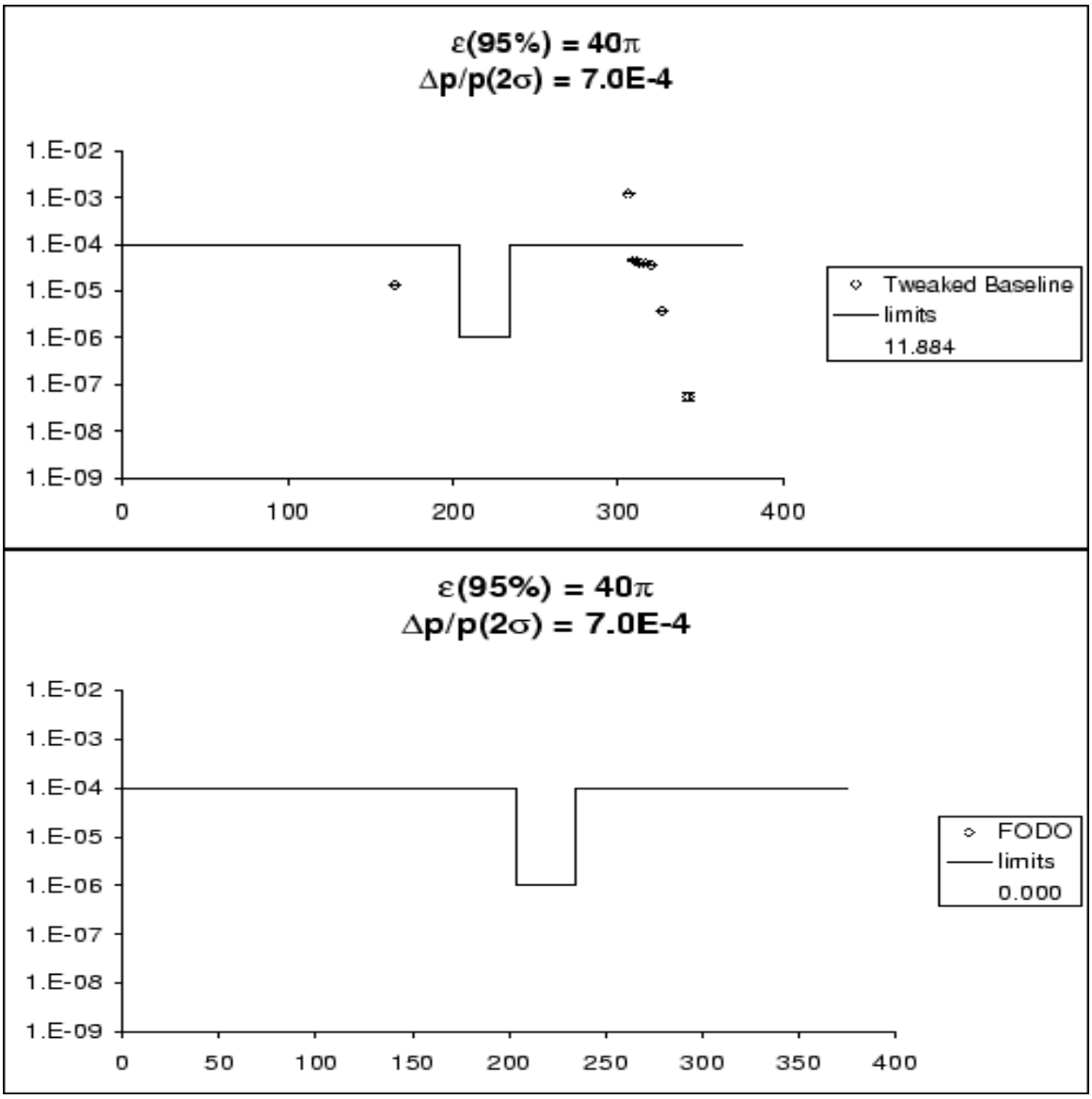
"FODO"

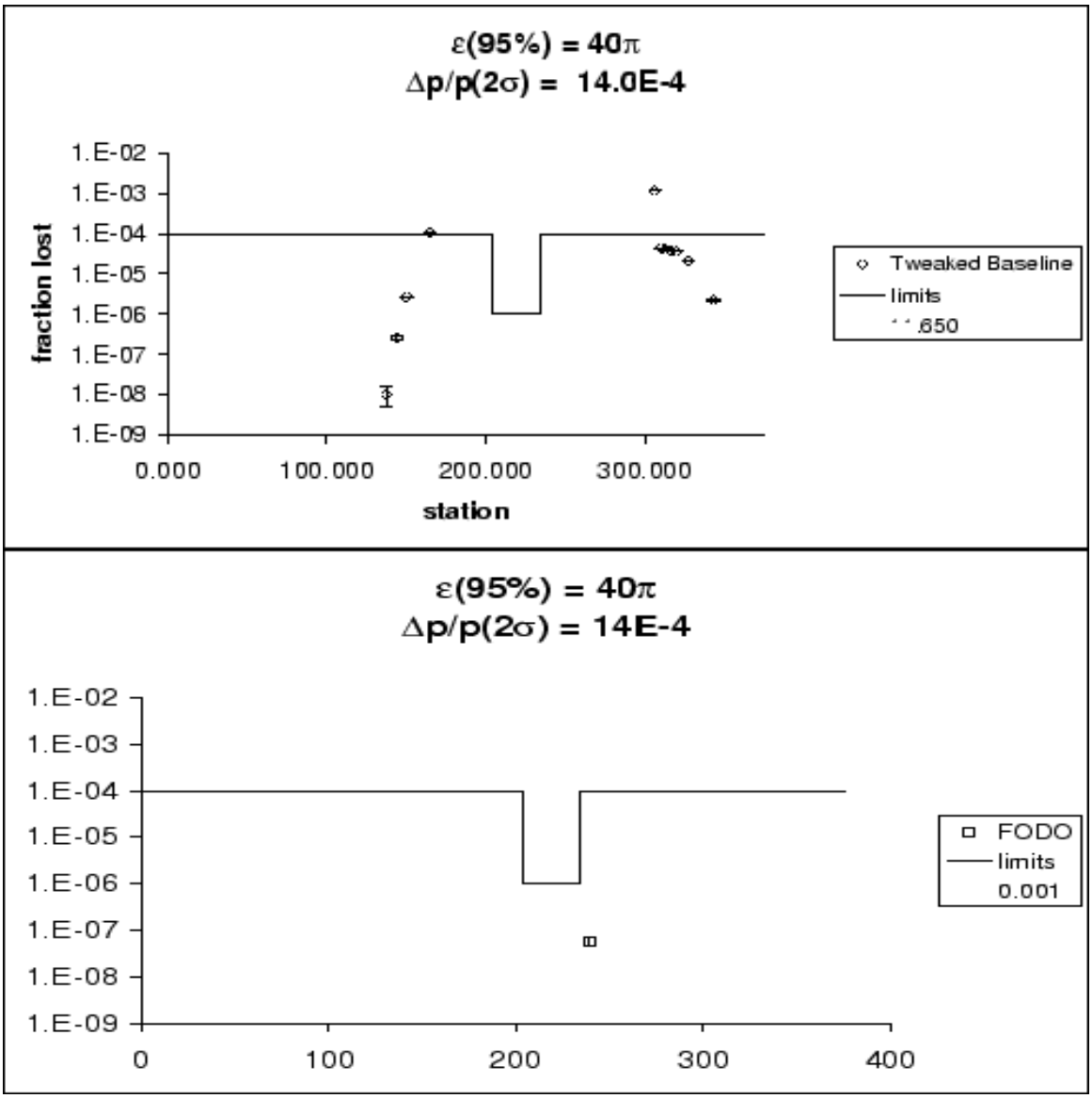


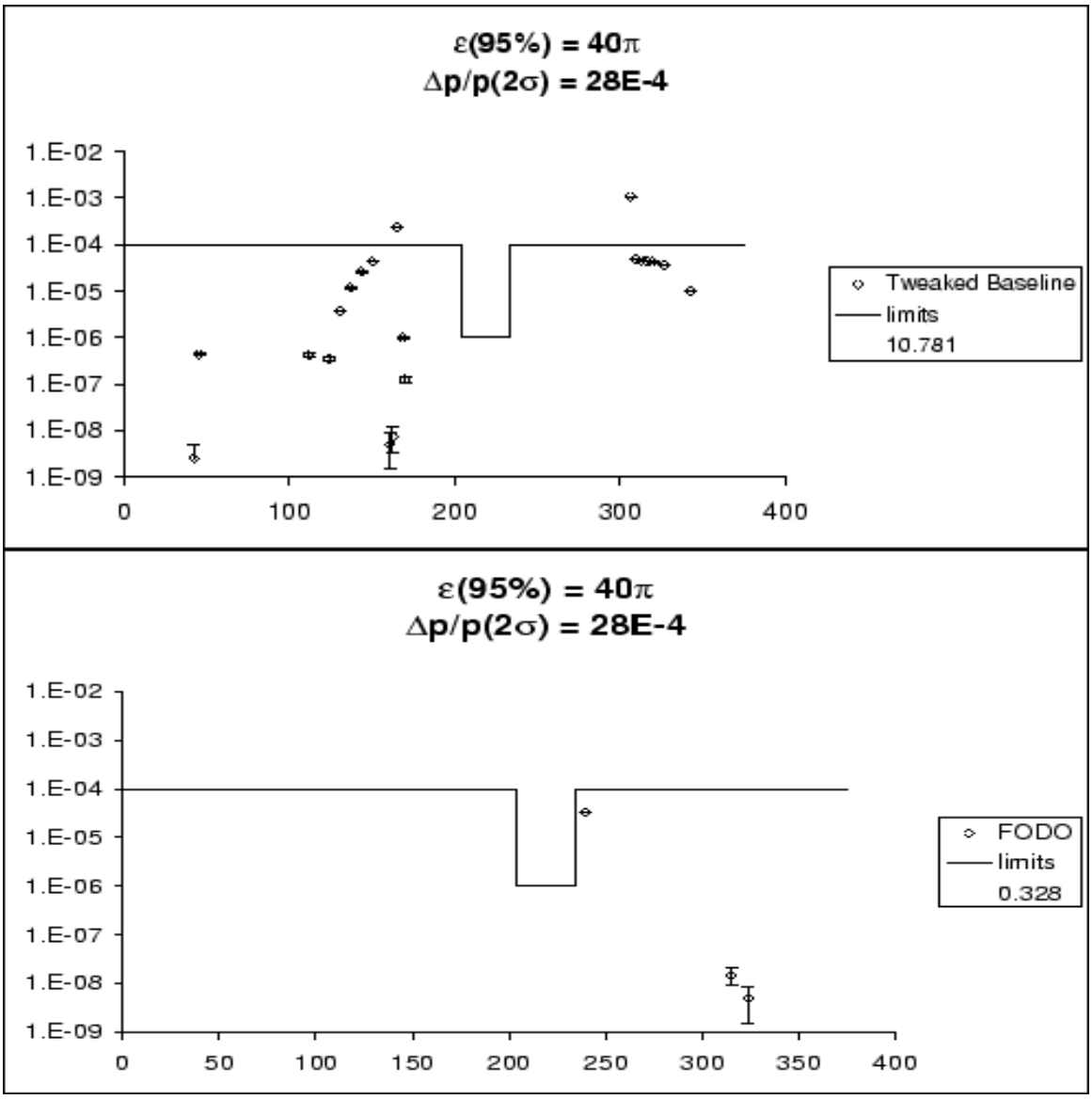
$$40\pi,\ \Delta p/p(2\sigma) = 14.0 \times 10^{-4}$$


ε(95%) = 25π
Δp/p(2σ) = 7.0E-4
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
1.E-09
0
100
200
300
400
Tweaked Baseline
limits
5.744


ε(95%) = 25π
Δp/p(2σ) = 7.0E-4
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
1.E-09
0
50
100
150
200
250
300
350
400
FODO
limits
0.000


ε(95%) = 40π
Δp/p(2σ) = 7.0E-4
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
1.E-09
0
100
200
300
400
Tweaked Baseline
limits
11.884
ε(95%) = 40π
Δp/p(2σ) = 7.0E-4
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
1.E-09
0
50
100
150
200
250
300
350
400
FODO
limits
0.000


ε(95%) = 40π
Δp/p(2σ) = 14.0E-4
fraction lost
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
1.E-09
0.000
100.000
200.000
300.000
station
Tweaked Baseline
limits
.650
ε(95%) = 40π
Δp/p(2σ) = 14E-4
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
1.E-09
0
100
200
300
400
FODO
limits
0.001


ε(95%) = 40π
Δp/p(2σ) = 28E-4
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
1.E-09
0
100
200
300
400
Tweaked Baseline
limits
10.781
ε(95%) = 40π
Δp/p(2σ) = 28E-4
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
1.E-09
0
50
100
150
200
250
300
350
400
FODO
limits
0.328